

Redesign and Construction Supervision of the Parking Area at HKBP Perumnas Klender Church

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ABSTRACT

The availability of adequate parking facilities is a critical factor in supporting the effective operation. HKBP Perumnas Klender Church faced limitations in its existing parking area, which potentially reduced user comfort and the efficiency of space utilization. The methodology included an existing-condition survey, technical design development, construction assistance, and on-site quality supervision. The construction activities comprised site preparation, septic tank installation, parking area concrete casting, and concrete finishing and curing processes. The results demonstrated that the implementation of the redesigned layout, supported by systematic technical supervision, successfully improved the functionality, safety, and usability of the parking area in accordance with user requirements. Furthermore, the installation of an adequate sanitation system contributed to the long-term operational sustainability of the facility and accommodated potential future changes in building usage. This PkM highlights that technical assistance through redesign and construction supervision can effectively improve the quality and performance of supporting infrastructure in social and religious facilities.

INTRODUCTION

The growth in the number of congregation members has created increasing demand for supporting facilities at HKBP Perumnas Klender Church, particularly parking infrastructure. To accommodate this demand and improve the overall comfort of church attendees, the development of an expanded parking area was proposed. As part of a community engagement initiative, the Community Service Team from the Faculty of Engineering, Christian University of Indonesia, participated in the redesign and construction supervision of the church parking facility. The project included site surveys, soil condition assessments, and the development of two-dimensional (2D) and three-dimensional (3D) design models using SketchUp software. The study was conducted at HKBP Perumnas Klender Church in East Jakarta, Indonesia, with the objective of providing a functional and efficient parking solution that meets the needs of the growing congregation, (Tampubolon, 2022) (Polonia et al., 2021). A comprehensive assessment of existing site conditions is a critical prerequisite for any infrastructure development project, including the construction of a church parking facility. As part of a public-use infrastructure system, the parking area should be designed and engineered in accordance with the prevailing Indonesian National Standards (SNI). Adherence to these standards ensures that the facility meets structural performance requirements and possesses adequate seismic resistance, thereby minimizing the risk of structural damage and enhancing public safety during earthquake events, (Silaban et al., 2023; Tampubolon et al., 2022). Considering the factors described above, the proposed development of the church parking facility must be supported by a well-conceived design framework and rigorous engineering analysis.

Careful planning is necessary to ensure structural reliability and to prevent potential failures during both the construction and operational phases. Figure 1 presents the existing structure designated for conversion into a church parking area. The development of sustainable physical infrastructure is an important component in improving service quality, accommodating future growth, and supporting the long-term operational effectiveness of the church, (Olaifa et al., 2025). One of the strategic facilities that contributes to the comfort of congregation members during worship is the availability of an adequate parking area. The provision of parking facilities represents one form of service offered by the church to support the needs of its congregation. Therefore, the physical condition, functionality, and comfort of the parking area are important aspects that require careful consideration in the planning and development process, (Sari & Abdurrahman, 2025; Tampubolon, 2022).



Figure 1. Existing Building Condition Prior to Redevelopment as a Church Parking Area

Based on the aforementioned background, this community service program aims to enhance the quality of church services through the provision of a safe, functional, and comfortable parking area. The activities carried out in this program include an evaluation of existing site conditions, design planning, assistance in material selection, preparation of cost estimates, and supervision of construction activities. As a partner in this community service initiative, HKBP Perumnas Klender Church faces significant challenges in the development of its parking facility. The primary issues encountered by the partner are related to limited technical knowledge during the initial stages of project implementation, necessitating a careful and efficient approach to the planning and execution of parking area construction works.

The first challenge faced by the community partner was limited knowledge of construction management, particularly regarding systematic construction procedures, appropriate material selection, and the estimation of material requirements and project costs. Insufficient understanding of these aspects may lead to an unstructured construction process, thereby reducing project efficiency and effectiveness. Furthermore, the selection of unsuitable materials may result in resource wastage and unforeseen cost overruns, which can adversely affect the overall project performance, (Firdaus et al., 2025; Satria et al., n.d.). Given the available budget constraints, effective construction planning and rigorous supervision are essential throughout the project implementation process. These measures are intended to accelerate construction activities, minimize costs, ensure the efficient utilization of financial resources, and achieve project

completion within the planned schedule, (Afonso et al., 2025; Tampubolon et al., 2025). By addressing these challenges, the renovation and development of the church parking area are expected to be carried out effectively and efficiently, resulting in a more comfortable and representative environment for all congregation members. A well-planned renovation not only improves the quality and functionality of the facility but also supports more conducive church activities and social interactions among the congregation, (Olaifa et al., 2025). In addition, this program is expected to provide valuable knowledge and practical skills to the community partner, enabling them to manage similar projects more independently and systematically in the future.

The community service program conducted at HKBP Perumnas Klender Church was designed to generate significant positive impacts, particularly in improving the quality of the church parking area renovation. The integration of structural engineering expertise and project management principles aims to create an environment that is more comfortable, functional, and aesthetically pleasing. The objectives and scope of the community service activities at HKBP Perumnas Klender Church are presented as follows:

- a) To enhance the comfort, functionality, and visual appeal of the church parking area

This activity aims to provide practical and efficient solutions while taking into account the budgetary constraints and limited technical knowledge of the community partner. The program addresses several key aspects, including the demolition of the existing structure, soil compaction procedures, concrete casting operations, and the development of a long-term utilization plan for the facility.

- b) To develop practical, efficient, and cost-effective solutions

This activity aims to provide practical and efficient solutions for the development of the church parking area while considering the budget limitations and technical knowledge of the community partner. The proposed solutions are expected to be sustainably implemented by the church to support the long-term operation and maintenance of the facility.

- c) To enhance the knowledge and skills of the community partner

This activity also aims to enhance the church's knowledge and skills in project management, material selection, and construction supervision. As a result, the partner organization is expected to become more independent and capable of managing similar projects in the future.

- d) To apply scientific knowledge and technological

This activity serves as a platform for the application of scientific knowledge and technology in the fields of structural engineering and project management within a real-world context. The implementation of these principles provides

mutual benefits for both the church and the community service team involved in the project.

Scope of Activities

The scope of this community service program includes the following activities:

a) Evaluation and analysis of Are Parking conditions

Conduct a comprehensive evaluation of the existing building condition proposed for conversion into a parking area, including an assessment of construction materials, concrete casting procedures, drainage culvert conditions, and the duration of the concrete curing process. The evaluation also aims to identify existing issues and formulate appropriate engineering solutions.

b) Assistance in Material Selection

Provide assistance to partners in the selection of materials that are in accordance with the needs of the parking area, budget, and functional needs. Ensure the selected materials are of good quality.

c) Supervision of the implementation of Parking Area work

Supervise the implementation process of parking area construction work, to ensure that the work is carried out in accordance with the design and technical specifications. Provide guidance and direction to each job implementer.

With the purpose and scope of these activities, it is hoped that this community service activity can have a significant positive impact on the church.

IMPLEMENTATION AND METHODS

The method of implementing this Community Service activity is in the form of direct supervision carried out in the field in direct coordination with the church construction team, for each implementation process in the field, in the form of material selection, soil compaction process, septic tank making, culvert area ironing, and casting process. Figure 2 shows a flowchart of the implementation of PkM activities carried out in the field.



Figure 2. Flowchart of PkM Implementation Activities

Planning Stage

1. Identify needs
 - a) Conducting a field survey to analyze the existing condition of the building and planning the demolition process.
 - b) Identify design needs and supporting facilities in the process of implementing the construction of parking areas.
 - c) Coordinating with the church construction team for the design of the parking area, determining the quality of the concrete used, the process of making septic tanks, ironing, and the implementation of casting activities.
2. Planning
 - a) Sketching the design of the parking area
 - b) Identify the tools used in the compaction process and during the casting process.

- c) Prepare a cost budget plan (RAB) based on the needs of construction and equipment procurement.

Implementation Stage

This stage includes the construction of the HKBP Perumnas Klender Church Parking Area, among others.

1. Location preparation
 - a) Demolishing the existing building that will be used as a church parking area according to the design that has been designed.
 - b) Adjusting the materials used, such as soil compaction, making septic tanks, installing iron in the culvert area, and determining the leveling of the foundry.
2. Casting Stage
 - a) Doing compaction well on the soil of existing buildings that have been dismantled
 - b) Installation of septic tanks
 - c) Reinforcement Installation in the culvert area before casting
 - d) Installation of tarpaulins in the area that has been compaction and determine leveling in each casting area so that the casting height is the same
 - e) Installation of casting tools before casting
 - f) Casting according to the predetermined area and checking the height/*levelling*
 - g) Performing concrete curing

Trial and Evaluation Stage

- a) Testing the feasibility of the church parking area according to the design and evaluating the comfort of the parking area.

Maintenance and Management Stages

- a. Establish a parking area maintenance schedule
- b. Develop rules for the use of space to keep it well organized.

With this implementation method, the HKBP Perumnas Klender church parking area building can run optimally, provide comfort for users, and improve the quality of church services.

RESULTS AND DISCUSSION

The results of this community service activity are in the form of parking area design and assistance in budget calculation and supervision of the implementation of the construction of church parking areas. Based on field observations, it is done that there are still existing buildings, so it is necessary to carry out demolition. In addition, the use of quality concrete (f_c') to be used, the

soil compaction process, and the casting process carried out. A well-organized work system in the field will produce good work according to the provisions that are designed/planned. Figure 3 shows the planning design for the renovation of the the HKBP Perumnas Klender Church Parking.

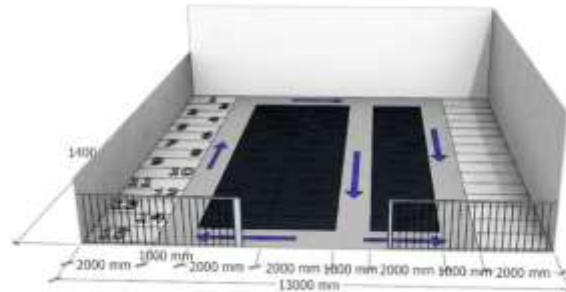


Figure 3. Planning design of the HKBP Perumnas Klender Church Parking

Based on the results of the analysis, the construction of a parking area was carried out which refers to the principles of safety design, smooth flow, and user comfort. Design recommendations include the division of parking zones. In addition, adjustments are made to the capacity of the motorcycle parking space based on the standard of user movement space needs, so that the parking area can function more optimally in various church activities. These results are also in line with the spatial planning standard (Neufert) which emphasizes the importance of adequate movement space to avoid. In addition, increasing partners' understanding of project management and material selection has a long-term impact on the sustainability of church construction management.

Process of Demolition of Existing Buildings and Soil Compaction

The construction work of the church parking area includes several initial stages, namely the demolition of the existing building, followed by the disposal of demolition debris, soil compaction, installation of cast tarpaulins and determination of *levelling*. Figure 4 shows the process of demolishing *the existing* building and the soil compaction process that has been carried out after the demolition is completed



Figure 4. Dismantling of *existing* buildings and soil compaction process using stampers

Casting and Levelling Zone Setting Process

The construction work of the HKBP Perumnas Klender church parking includes the demolition of existing buildings, the disposal of debris, and soil compaction, after this process is completed, the next stage of work carried out is the process of setting the casting zone and *levelling* the goal so that the casting process is carried out evenly, where the height of the cast plate used is 7-15 cm. Figure 5 shows the process of installing tarpaulins in 5 casting zones and determining levelling before casting.



Figure 5. The process of installing the tarpaulin in the casting zone and levelling *determination* before casting

The Process of Installing Iron in the Culvert Area

Ironing work is carried out on the culvert area before casting. The purpose of this ironing installation is to anticipate excessive load around the culvert area and prevent collapse from occurring. With the reinforcement installed, it is expected to be able to withstand the pull and pressure that occurs in the area. Figure 6 shows the ironing process carried out in the culvert area.



Figure 6. The process of assembling reinforcement in the culvert area

Septic Tank Installation Process

The installation of septic tanks in the parking area of HKBP Perumnas Klender is planned not only to meet current sanitation needs, but also as part of a strategy to provide infrastructure that is adaptive to possible changes in the building's function in the future (Alfandi et al., 2024; Spiller, 2017). This concept is in line with the principle of *flexible infrastructure design* which states that wastewater and sanitation systems need to be designed flexibly to deal with changing needs due to building developments, increasing the number of users, and changes in space utilization patterns. Adaptive infrastructure has the ability

to maintain system performance without requiring major modifications when there is a change in building capacity or function (Spiller et al., 2015). Figure 7 shows the process of installing a septic tank in the parking area of HKBP Perumnas Klender.



Figure 7. Installation of septic tanks in the parking area of HKBP Perumnas Klender

Parking Area Casting Process

The casting work of the parking area of the HKBP Perumnas Klender Church began from checking the levelling/elevation adjustment of the work surface to obtain a flat surface according to the plan. The levelling process has an important role in the thickness of the concrete slab and the surface drainage system. Surfaces that do not match the elevation may cause waterlogging and reduce the service life of the construction. Once the surface elevation meets the planning requirements, the work proceeds with the setting of the casting zone to control the casting sequence, speed up the implementation process, and maintain the continuity of fresh concrete placement. Zone regulation also aims to reduce the potential for *cold joints* due to too long casting time lags between one part and another. With the division of zones, the concrete distribution process can take place more effectively and facilitate quality control during the work (Choiriyah et al., 2020). The next stage is the installation of a cast pump (*concrete pump*) as a medium for distributing concrete from the *mixer truck* to the foundry site. The use of cast pumps was chosen because it can increase work efficiency, speed up the concrete placement process, and facilitate the distribution of materials in areas that have limited access. In addition, the pumping method allows for a more continuous flow of concrete so that the quality of the concrete mixture is maintained during the casting process. According to the *guidelines of the American Concrete Institute* (ACI), the use of cast pumps is one of the effective methods to maintain work productivity and produce a more uniform concrete placement when supported by good mix quality control (Feys et al., 2022). After the concrete is placed in a predetermined area, a *screeding* and compaction process is carried out to remove air cavities and ensure that the concrete fills all planned parts. This stage is then continued with *finishing* the concrete surface using a leveling tool so that the texture and elevation are obtained in accordance with the function of the parking area. The finishing process must also pay attention to the condition of fresh concrete and the processing time so that the surface quality remains optimal. Overall, the implementation of the casting of the parking area of the HKBP Perumnas Klender Church starting from the levelling stage, setting the

casting zone, installing cast pumps, to finishing shows the application of a systematic and controlled construction method. Each stage has an important contribution to maintaining the quality of concrete structures, improving the efficiency of work implementation, and producing parking areas that have optimal strength, durability, and service functions in the long term (ACI Committee 304, 2013; COMM REP, 1971). Figure 8 shows the casting process of the HKBP Perumnas Klender parking area.



Figure 8. The process of casting the parking area of HKBP Perumnas Klender.

Finishing Work

After the casting process is completed, the finishing of the concrete surface is carried out to produce a flat, neat surface, and in accordance with the function of the parking area. *Good finishing* plays an important role in improving the comfort of use, aesthetics, and resistance of concrete surfaces to vehicle loads and weather influences (American Concrete Institute, 2015). The next stage is concrete *curing*, which is carried out to maintain the moisture of the concrete during the cement hydration process. *Curing* aims to prevent too fast water loss so that the increase in the compressive strength of concrete can take place optimally and reduce the risk of shrinkage cracks on the concrete surface. Adequate curing implementation has been proven to improve the strength, durability, and service life of concrete construction (ACI Committee 308, 2016; Neville, 2011). Figure 9 shows the finishing of the parking area of the HKBP Perumnas Klender church



Figure 9. Finishing the parking area of the HKBP Perumnas Klender church
Sumber: (<https://maps.app.goo.gl/wM4iWY8f3MpK4jxn7>)

CONCLUSIONS AND RECOMMENDATIONS

Redesign and supervision of the construction of the parking area of the HKBP Perumnas Klender Church has been successfully carried out to improve

the quality of church supporting facilities and infrastructure. The redesign carried out resulted in the planning of a parking area that is more in accordance with the needs of the congregation, the existing condition of the land, and the potential for future facility development. Supervision during the construction process shows that every stage of work, starting from land preparation, demolition of existing buildings, soil compaction, septic tank installation, casting, to concrete finishing and curing, can be carried out in accordance with the planning and technical specifications that have been set. The implementation of good supervision contributes to the achievement of the quality of work, the accuracy of construction implementation according to the planned time, and the optimization of the function of the parking area. The results of the activity show that the construction of parking areas not only increases the capacity and comfort of church facilities, but also supports the sanitation, safety, and sustainability aspects of building use. Thus, this redesign and supervision activity provides real benefits in supporting congregational services and can be a model of technical assistance in the development of social and religious facilities in the future.

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We realize that this activity still has limitations. Therefore, we expect constructive input for the improvement of similar activities in the future. Hopefully the results of this PKM activity can provide benefits for the services of the HKBP Perumnas Klender Church.

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